

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY

No. 69, ANNA SALAI, GUINDY, CHENNAI – 600 032.

M.D. / M.S.

POST GRADUATE DEGREE COURSES



SYLLABUS AND CURRICULUM

2021 - 2022

MD ANAESTHESIOLOGY

THE TAMIL NADU Dr. M.G.R MEDICAL UNIVERSITY, CHENNAI

MD ANESTHESIOLOGY

The curriculum shall train a candidate to manage anaesthesia in a competent, compassionate and caring manner.

Learning shall be self directed and essentially autonomous.

Exposure to all the sub-specialities shall be achieved

A combination of formative and summative assessments shall ensure completion of goals and training.

1. GOALS:

To produce competent and compassionate specialists who

- a) shall recognize the health needs and ethically carry out the professional obligations towards the patient.
- b) shall attain all the required competencies within all the sub-specialities in the speciality of anaesthesiology, enabling good practices at the secondary and tertiary levels of health care delivery.
- c) Shall take effort to be aware and update knowledge about the latest advances and developments in the field.
- d) Shall acquire the basic skills to teach medical and para-medical professionals.
- e) Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
- a) Shall orient oneself to the principles of research methodology and epidemiology

2. OBJECTIVES:(Ref: Bloom's taxonomy of learning domains)

A. Knowledge to be gained from the syllabus

B. Skills to be learned from the practical training

C. Attitudes to be developed during the training period

The curriculum shall include

- a) Anatomy, physiology and biochemistry relevant to anaesthesiology.
- b) A thorough knowledge of the pharmacokinetics and pharmacodynamics of anaesthetic drugs for various age groups
- c) Knowledge of cardiovascular, respiratory, neurological, hepatobiliary, renal and endocrine homeostasis and related drugs used in patients undergoing anaesthesia.
- d) Physics and principles involved in the construction and functioning of anaesthesia machine and equipment used to provide anaesthesia and patient vital signs monitoring.
- e) Knowledge of the commonly used techniques in General, Regional and Local anaesthesia
- f) Understanding the concept of unconsciousness and its implications in anaesthesia.
- g) Knowledge and management of acute and chronic intractable pain.
- h) Knowledge of intensive care / therapy.

- i) Knowledge of medical statistics
- j) Knowledge and gain expertise in cardiopulmonary resuscitation.
- k) Knowledge of medical ethics.

The course content should stimulate the thought processes of the candidate and encourage the candidate to acquire new information from books, journals, lectures, seminars and discussions. It should stimulate reflective thinking and problem solving by critical analysis of events during anaesthesia and interpretation of the data and logical reasoning.

3. COMPONENTS OF POST-GRADUATE CURRICULUM

THEORETICAL KNOWLEDGE, PRACTICAL AND CLINICAL SKILLS INCLUDING RESEARCH WORK AND THESIS

FIRST YEAR: BASIC TRAINING

Basic Sciences: Knowledge

Post-graduates should understand the principles involved in the measurement of relevant variables and the requirements of equipment and monitoring in anaesthesia. Knowledge is expected in the areas outlined below.

Physics and Clinical Measurement Principles of Measurement .

- SI units
- Behaviour of fluids (gases and liquids)
- Flow of fluids
- Measurement of volumes, flows, and pressures
- Measurement of temperature
- Humidification
- Oximetry
- Analysis of Anaesthetic gases
- Capnography
- Electrical safety
- Fires and explosions
- Equipment and Apparatus
- Equipment design and standards
- Gas supply in bulk and cylinders
- Anaesthesia delivery system, including pressure valves and regulators
- Vaporisers
- Breathing systems

- Devices to maintain the airway (laryngoscopes, endotracheal tubes, tracheostomy tubes, face masks, laryngeal masks, airways, fiberoptic bronchoscope and video laryngoscope)
- Demonstrate knowledge of principles of sterilization and universal precautions, selection, maintenance and sterilization of anaesthesia and related equipment, Infection control, cross contamination in OT and ICU.
- Immune response and anaesthesia
- Information systems
- Data storage and retrieval Monitoring
- Anaesthesia record – Manual and electronic record keeping
- Minimum monitoring standards
- Additional monitoring when appropriate (including central venous pressure, pulmonary artery pressure, cardiac output, cerebral function, temperature, coagulation, blood loss, blood sugar).
- Describe the development and history of anaesthesia as a specialty with knowledge of important personalities who have contributed towards it.

Preoperative Assessment / Pre-anaesthesia clinics

- Appropriate history taking
- Physical examination including airway assessment, respiratory, cardiovascular, hydration status and neurological examinations for all age groups
- Referral to other specialists when necessary
- Establishment of a rapport with the patient to provide reassurance, disclosure of risk, information, and discussions on complementary medicine and informed consent
- Communication and consultation skills face-to-face, by phone and in writing
- Pulmonary function tests
- Measurement of cardiovascular function
- Interpretation of common radiology and imaging scans and investigations
- Other investigations as appropriate

Conducting Anaesthesia

- Applied cardiac and respiratory physiology
- Applied pharmacology and variability in drug response
- Selection and planning of the anaesthesia technique
- Decision-making relating to postponement or cancellation of surgery
- Routine inhalation and intravenous inductions
- Maintenance of anaesthesia
- Correct usage of anaesthesia delivery systems [low flow Anaesthesia]

- Application and interpretation of monitored variables and neuromuscular blockade
- Use of muscle relaxants
- Application of mechanical ventilation
- Management of the airway and intraoperative complications
- Common regional anaesthesia techniques (eg, epidural and spinal anaesthesia and Regional Nerve blocks)
- Maintenance of accurate records

Postoperative Care

- Safe recovery transport and handover in the post-anaesthesia recovery room
- Post-operative consultations
- Management of postoperative pain, fluid requirements, and nausea and vomiting

Basic Sciences : Skills- Clinical skills

Post-graduates should provide safe anaesthesia care and pain management for uncomplicated patients undergoing non-major surgery.

Post-graduates should be competent in the following technical skills -

- Maintenance of an adequate airway
- Rapid sequence induction
- Basic and advanced Life Support for adult and paediatrics
- Aseptic techniques
- Venous access
- Arterial blood gas collection
- Arterial cannulation
- Central venous cannulation
- ECG recording and interpretation
- Lumbar puncture
- Blood culture collection
- Emergency management of a pneumothorax
- Demonstrate ability to give extradural block (EDB) lumbar and thoracic, Spinal Block, and Peripheral Nerve Blocks under supervision.
- Demonstrate ability to use ultrasound machine for giving blocks and venous cannulation.

Post-graduates should be familiar with the following clinical protocols in the delivery of safe anaesthesia care, and be able to respond accordingly for crisis management.

- Checking of the anaesthesia delivery system
- Airway assessment and anticipation of Difficult airway and its management which may be acute and may be life threatening
- Inadequate airway; failed intubation, obstructed airway, oesophageal intubation, endobronchial intubation, and unplanned extubation .
- Laryngospasm .
- Bronchospasm .
- Hypertension.
- Hypotension.
- Arrhythmias.
- Myocardial Ischemia.
- Hypoxia .
- Hypercarbia.
- Hypoventilation.
- Hyperventilation.
- Hypothermia .
- Hyperthermia .
- Malignant hyperthermia.
- Anaphylaxis .
- Residual neuromuscular blockade.
- Inadequate neuraxial blockade .
- Seizures .
- Gas embolism.
- High ventilator peak inspiratory pressures.
- Pulmonary aspiration .
- Pneumothorax.
- Should learn to organize resources in case of mass casualty.
- Perform triage.
- Assess, transport and manage mass casualties / disaster management and camp anaesthesia.
- Manage massive haemorrhage and massive blood transfusion.
- Transport critically ill patient.

Basic Sciences: Skills- Educational skills

- Developing a study plan for the rest of the training period
- Reviewing study plans and correcting for deviations (eg, catching up on deficient knowledge or experience)
- Reflecting on previous learning experiences with the aid of the Learning Portfolio

- Linking basic science teaching with clinical practice & Studying effectively
- Participating in small-group learning and educational activities
- Being aware of decision-making processes
- Managing time effectively for study, work and home/leisure
- Giving and receiving feedback
- Developing insight into personal limitations
- Using the Internet including e-mail
- Conducting and appraising literature searches
- Appraising journal articles including the application of statistics
- Carrying out oral presentations and professional communication.

OBSTETRIC ANAESTHESIA AND ANALGESIA: KNOWLEDGE

- Maternal physiology
- Process of labour and delivery
- Foetal and neonatal physiology
- Placental physiology
- Obstetric and post partum pharmacology
- Endocrine pharmacology
- Pharmacological considerations for newborn resuscitation
- Pharmacology of placental drug transfer
- Anatomy — airway, spine, pelvis, birth canal, gravid uterus, and nerve and blood supply in pregnancy
- Drugs used for fertility support and IVF
- Ecbolics and tocolytics
- Principles of in-vitro fertilisation
- Antenatal care
- Labour and delivery
- Maternal monitoring during labour
- Caesarean section; indications and levels of urgency
- Abortions and septic abortions
- Postpartum period
- High-risk Obstetrics- medical, obstetric or anaesthesia history
- Pre-existing disease in pregnancy
- Substance abuse during pregnancy
- Pre eclampsia and eclampsia, pathophysiology and management
- Obstetric complications, eg, breech, malpresentation, multiple pregnancy and abnormal placentation
- Obstetric interventions; indications and anticipation of anaesthesia and analgesia
- Amniotic fluid, air and pulmonary embolism, pathophysiology and management

- Obstetric haemorrhage- antepartum, peripartum and postpartum
- Foetal and Neonatal Considerations
- Foetal teratogenicity, carcinogenicity, and congenital abnormalities
- Foetal evaluation and monitoring
- Antepartum and intrapartum foetal compromise
- Foetal death in utero; pathophysiology and psychological issues
- Neonatal resuscitation
- Apgar score and neuro-adaptive scores, and their prognostic significance
- Neonatal surgery - Anaesthesia Management
- Pre-anaesthesia assessment of the pregnant patient and identification of high risk patients eg: Risk factors in anaesthesia such as Pre-existing diseases like cardiac disease, hypertension, respiratory disease, diabetes, thyroid disease, intracranial disease, bleeding disorders, renal disease and neuromuscular disease
- Adolescent or elderly primigravid pregnancy
- Morbid obesity
- Thromboembolic disease
- Anaesthesia for non-obstetric surgery in the pregnant patient
- Anaesthesia for elective obstetric procedures
- Anaesthesia for emergency obstetric procedures
- Anaesthesia for Caesarean section
- Pain management in obstetrics – Labour analgesia
- Complications of General Anaesthesia like Difficult airway management, Pulmonary aspiration, Awareness during general anaesthesia
- Complications of Regional Analgesia and anaesthesia, eg, high block, local anaesthetic toxicity, neurological sequelae
- Management of inadequate or failed regional anaesthesia and analgesia
- Management of severe haemorrhage; surgical, antepartum and postpartum
- Maternal morbidity and mortality; incidence and legal and ethical issues
- Organisation of an obstetric anaesthesia and analgesia service
- Safe radiation practice during pregnancy

OBSTETRIC ANAESTHESIA-SKILLS

- Airway assessment in pregnancy
- Rapid sequence induction and Acid Aspiration prevention protocol
- Emergency airway management
- Implementing epidural, spinal, and combined spinal/epidural anaesthesia and analgesia,
- Management of local anaesthetic toxicity
- Management of high regional block

- Management of severe obstetric haemorrhage
Post-graduates should be familiar with clinical drills for crises management especially for airway emergencies
- Failure to intubate algorithm in obstetrics
- Advanced Life Support in the obstetric patient
- Resuscitation of the neonate
- Management of pulmonary aspiration during general anaesthesia

SHOULD DEMONSTRATE AT THE END OF FIRST YEAR

- Demonstrate skills in providing basic life support, advanced cardiac life support, trauma life support and paediatric-neonatal life support, train medical and paramedical staff in BLS and ALS.

Communication skills

- Call for help in Cardio Pulmonary Resuscitation, PACU, in Emergencies
- Care of terminally ill, Hospices management, Do not resuscitate orders.
- Establishment of rapport with patients, attenders , relatives of patients
Especially in PACU, INTENSIVE CARE UNITS, RECOVERY UNITS to provide reassurance , disclosure of current condition & any procedural information.
- To obtain informed consent from patients or attenders /relatives
- Knowledge of general principles of medical audit and Critical incident reporting.
- Documentation of events correctly /properly for future verification, research activities .
- Knowledge of Hospital, ICU and OT design and planning.

II. SECOND YEAR- ADVANCED TRAINING:

Research and Scientific Enquiry: Knowledge

- Proposing a hypothesis
- Information search and literature review
- Research design, bias and appropriate methods of measurement
- Data collection and storage
- Good record keeping
- Common statistical tests and application of statistics
- Interpretation of results
- Responsibilities of investigator to the ethics committee
- Principles of writing a scientific paper

- Principles of oral or poster presentation of a paper
- Ethical principles
- The process of obtaining funding and writing a basic grant application

Research and Scientific Enquiry : Clinical-Skills

Post-graduates should acquire skills in scientific learning as a medical specialist

- Conducting and appraising literature searches
- Appraising journal articles including the application of statistics
- Applying the principles of evidence-based medicine to clinical practice
- Carrying out oral presentations and professional communication
- Presenting quality assurance exercises or projects
- Developing facilitation skills, such as tutoring in small-group learning and conducting small-group meetings
- Preparing the thesis protocol with the help of Guide, obtaining approval from Ethics committee
- Clinical application and performance of thesis/Dissertation in the prescribed period

Research and Scientific Enquiry : Attitudes

Post-graduates should develop an appreciation of and continue research and scientific enquiry

- Valuing rigorous educational and scientific processes
- Distinguishing between practice with a sound scientific basis and that which requires further objective assessment
- Committing to informed consent, confidentiality and all other ethical principles of research
- Committing to continuing professional development

ANAESTHESIA FOR HIGH-RISK ELECTIVE AND EMERGENCY SURGERY:

KNOWLEDGE

- Preoperative evaluation and resuscitation
- Thromboembolism prophylaxis
- Perioperative and prophylactic antibiotics
- Management of coagulopathies
- Regional anaesthesia for abdominal, vascular, and imaging procedures including anatomy, and physiological and pharmacological aspects
- Informed consent and consent for incompetent patients
- Postoperative care, Management of postoperative pain, phantom-limb pain and pain from injury

Anaesthesia for Trauma Surgery

- Assessment and immediate care; primary and secondary survey, Trauma severity scores
- Emergency airway management
- Establishing intravenous access
- Priorities of resuscitation, investigations, and surgical procedures
- Physio-biochemical effects of trauma
- Managing facial, head and cervical spine injuries
- Glasgow Coma Scale and other scores of consciousness
- Pathophysiology of head injury including changes in cerebral blood flow, cerebral metabolism and intracranial pressure
- Pathophysiology and management of shock
- Pathophysiology of blood loss and massive blood transfusion
- Volume replacement
- Managing abdominal and chest injuries
- Management of burns procedures, including: – Understanding the pathophysiology of burns – Anaesthesia for debridement and skin grafting – Drills in burns resuscitation .
- Managing coagulopathies .
- Transport of ventilated or injured patients including portable ventilators and monitoring systems

Co-existing Medical Conditions Relevant to Anaesthesia

- ❖ Endocrine disorders including phaeochromocytoma, hyperthyroidism, hypothyroidism, and diabetes mellitus
- ❖ Disorders of the cardiovascular system
- ❖ Disorders of the respiratory system
- ❖ Disorders of the nervous system
- ❖ Disorders of the liver, biliary tract and gastrointestinal system
- ❖ Renal disorders
- ❖ Water, electrolyte and acid-base disturbances
- ❖ Haematological disorders, including coagulopathies
- ❖ Skin and musculoskeletal disorders, including rheumatoid arthritis and ankylosing spondylitis
- ❖ Psychiatric disorders and substance abuse
- ❖ Disorders associated with ageing
- ❖ Obesity

ANAESTHESIA FOR HIGH-RISK ELECTIVE AND EMERGENCY SURGERY:

SKILLS:

Post-graduates should provide safe anaesthesia for

- Major abdominal surgery
- Laparoscopic surgery
- Trauma surgery –post-graduates should revise pre-assessment skills, including taking an appropriate history and performing an appropriate physical examination
(including airway assessment, cardiovascular, respiratory and neurological examinations) to assess the patient's status.

Post-graduates should become competent in the following technical skills--

- Securing an airway, arterial and central venous cannulation, and rapid sequence induction
- Cricothyroidotomy and percutaneous tracheostomy
- Cannulation of major vessels for volume resuscitation
- Awake fiberoptic intubation
- Thoracic and lumbar epidural and spinal anaesthesia
- Blood conservation strategies
- Regional nerve blocks for abdominal and lower limb surgery
- Chest drain insertion
- Immobilisation and care of cervical spine injuries
- Post-graduates should be familiar with clinical drills for crises management.
- Airway emergencies eg, “cannot intubate, cannot ventilate”, difficult airway, hypoxia and abnormal end-tidal CO₂ levels
- Managing major intraoperative events in aneurysm and abdominal surgery
- Drill for the primary and secondary survey
- Drill for raised intracranial pressure
- Drill for tension pneumothorax
- Drill for managing severe haemorrhage
- Drill for managing cardiac arrest (ACLS Algorithm)
- Drill for managing malignant hyperthermia

ENT, Eye, Dental, Maxillofacial, and Head and Neck Surgery: Knowledge

- Cardiovascular, respiratory and neurological physiology
- Physiology of gases in closed body cavities
- Pharmacology of local anaesthetic agents
- Pharmacology of local vasoconstrictors
- Anatomy of the head and neck and abnormal facies
- Anatomy of the airway, nasal passages, larynx, pharynx and middle ear
- Effects of surgery and radiation on the airway

- Monitoring in anaesthesia
- Neurological monitoring
- Lasers-- types, uses in surgery, complications and precautions
- Airway devices and types of tracheal tubes, eg, Micro-laryngeal, Rae tubes
- Equipment for difficult tracheal intubation
- Equipment for jet ventilation

Anaesthesia for ENT surgery

- Pre-operative airway assessment
- Tonsillectomy and adenoidectomy, including quinsy and postoperative bleeding
- Microlaryngoscopy
- Radical head and neck surgery
- Laryngectomy and Pharyngolaryngectomy
- Laser surgery .
- Nasal and sinus operations.
- Parotid tumor surgery .
- Myringoplasty .
- Middle ear surgery.
- Microsurgery of the ear.
- Managing partial airway obstruction including: –
- Epiglottitis
- Foreign bodies – Airway And Esophagus
- Laryngeal tumours
- Oropharyngeal cysts and abscesses
- Elective and emergency tracheostomy
- Paediatric problems, eg, relating to disease, airway, larynx and craniofacial disorders
- Post-operative care

Anaesthesia for Dental surgery

- Outpatient dental procedures- sedation and general anaesthesia
- Inpatient dental surgery
- Dental procedures on the mentally challenged
- Dental procedures on patients with bleeding disorders
- Oral surgery
- Fractured jaw
- Maxillary fractures according to the Le Fort classification
- Dental sepsis

Anaesthesia for Eye surgery

- Anatomy and physiology of extremes of age
- Anatomy of orbit and contents
- Physiology of intraocular pressure
- Ocular perfusion
- Eye reflexes (oculocardiac, oculorespiratory, oculoemetic)
- Anatomy of orbit, extraocular muscles, blood vessels, lacrimal apparatus

- ▢ Local anaesthetic agents for eye surgery
- ▢ Other drugs for eye surgery, eg, topical agents, vasoconstrictors, mydriatics, miotics, and agents to reduce intraocular pressure
- ▢ General anaesthesia for eye surgery including:
 - ▢ Examination under anaesthesia
 - ▢ Laser eye surgery
 - ▢ Intraocular surgery
 - ▢ Extraocular surgery
 - ▢ Retinal detachment
 - ▢ Plastic and orbital surgery
 - ▢ Emergency eye surgery and use of suxamethonium in penetrating eye injury
- ▢ Monitoring
- ▢ Postoperative care, management of nausea and vomiting
- ▢ Principles of regional retrobulbar and peribulbar block and choosing between general and regional anaesthesia techniques
- ▢ Sedation for eye procedures
- ▢ Principles of anaesthesia for day case
- ▢ Paediatric considerations

Anaesthesia for Maxillofacial, Thyroid, and Head and Neck Surgery

- ▢ Pre-operative airway assessment
 - ▢ Management of anaesthesia for major maxillofacial surgery, which may involve prolonged anaesthesia, major blood loss, hypothermia and multiple procedures
 - ▢ Management of anaesthesia for facial trauma: emergency and semi-elective, including fractured jaw and maxilla
 - ▢ Management of anaesthesia for cancer, plastic and cosmetic surgery on the face, head and neck, including surgery for cleft palate
 - ▢ Management of thyroid surgery, including Anaesthesia for thyroid and parathyroid surgery
 - ▢ preparation and management of thyroid and parathyroid disorders preoperatively
 - ▢ Post thyroidectomy bleeding
 - ▢ Managing a “thyroid storm”
- Identification and management of nerve supply of larynx
- ▢ Sedation for head and neck procedures
 - ▢ Post-operative care

ENT, Eye, Dental, Maxillofacial, and Head and Neck Surgery : Skills

- ▢ Tracheal intubation
- ▢ Nasal intubation
- ▢ Use of special tubes
- ▢ Placement and removal of packs
- ▢ Applying topical local anaesthesia to the airway
- ▢ Securing the difficult airway

- Recognising the high-risk airway
- Use of stylets and bougies
- Awake intubation
- Retrograde catheter technique
- Fiberoptic intubation
- Laryngeal mask airway intubation
- Failed intubation or ventilation drill
- Cricothyroidotomy and percutaneous tracheostomy
- Transtracheal ventilation
- Managing the airway in trauma and burns
- Upper airway obstruction drill
- Post extubation drill for difficult airway
- Spontaneous gaseous induction for airway obstruction
- Regional and local anaesthesia of the head and neck
- Management of postoperative nausea and vomiting in head and neck surgery
- Management of postoperative facial and airway swelling.

Paediatric Anaesthesia: Knowledge

- Anatomy relevant to airway management and breathing
- The physiology of respiration, circulation, fluid balance and thermoregulation
- The pharmacology of anaesthetic agents, analgesics and common paediatric medications, especially the relationship of dose to the size/maturity of child
- The relevance of surface area of children of various ages
- Stages of development of the normal child and their relevance to hospitalization

General principles of perioperative management relevant to children, emphasising:

- common childhood illnesses and their influence on anaesthesia and surgery
- fasting guidelines
- fluid and electrolyte replacement
- temperature control
- specialised equipment for children of different sizes
- perioperative monitoring
- dosage and administration of emergency drugs
- postoperative apnoea detection and management
- acute and persistent pain management

Relevant features of important childhood conditions: respiratory infections, asthma

- prematurity and its complications
- facial anomalies affecting the airway

- Neonatal emergencies
 - ▢ respiratory distress,
 - ▢ tracheo-oesophageal fistula,
 - ▢ congenital diaphragmatic hernia,
 - ▢ necrotising enterocolitis,
 - ▢ abdominal wall defects
- other childhood emergencies- inhaled/ingested foreign bodies, fractures, head injuries and burns /Scalds
- ▢ congenital cardiac disease; especially ASD, VSD, Tetralogy of Fallot
- ▢ cerebral palsy
- ▢ chronic diseases of childhood; especially cystic fibrosis, muscular dystrophy
- ▢ congenital syndromes- Down's, Pierre-Robin, mucopolysaccharidoses
- ▢ malignancy and the treatment of malignancy
- ▢ renal failure
- Malignant Hyperthermia

Paediatric anaesthesia Knowledge-Clinical management

Applying principles of paediatric anaesthesia for the following surgical subspecialties:

- ▢ Neurosurgery
- ▢ Ophthalmology
- ▢ Dental surgery
- ▢ Plastics and reconstructive surgery
- ▢ Thoraco-abdominal surgery
- ▢ Cardiac surgery and procedures
- ▢ Urology surgery and procedures/investigations
- ▢ Orthopaedic Surgery

- Otolaryngology
 - ▢ General surgery
 - ▢ Trauma and Burns
- Applying principles of paediatric anaesthesia for diagnostic procedures
 - ▢ Recognising and managing the sick child
 - ▢ Recognising and managing reversal to transitional fetal circulation
 - ▢ Managing fluid therapy in paediatric patients
 - ▢ Managing specific childhood syndromes and disorders
- Applying principles of paediatric anaesthesia for procedures outside the operating theatre, including patient transport
 - ▢ Caring for paediatric patients undergoing imaging investigations, which may require sedation or anaesthesia

- Recognising and managing paediatric emergencies including basic and advanced life support Management of patients requiring paediatric intensive care, ventilatory management, and support of circulation. Resuscitation of neonates and children of all ages. [PALS]
- Understanding the organisation of a paediatric anaesthesia and analgesic service

Paediatric Anaesthesia: Skills

Post-graduates should demonstrate decision-making and clinical skills, and perform

- Paediatric advanced life support Manage emergencies and conditions including
- Hypoxia
- Bronchospasm
- Apnoea
- Upper airway obstruction including upper airway infection
- Bradycardia and other arrhythmias
- Cardiac arrest
- Hypovolaemia
- Neurological compromise
- Epiglottitis and croup
- Inhaled foreign body
- Infantile airway obstruction
- Laryngospasm
- Masseter spasm
- Postoperative stridor
- Aspiration of gastric contents

Technical skills, such as airway management, vascular cannulation and regional anaesthesia should be demonstrated for paediatric patients

Interpersonal skills in dealing with paediatric patients and their parents

Intensive Care: Knowledge

Understanding the spectrum of critical illnesses requiring admission to ICU.

- Understanding of the operation of mechanical ventilators including different ventilatory modalities non-invasive ventilation, complications and modes of weaning.
- Principles and application of Oxygen Therapy
- Glycemic control in the critically ill patient
- Practice of Hypothermia and prevention of cerebral injury after cardiac arrest

- Delivering appropriate nutritional support - enteral and parenteral.
- Proper use of sedative/hypnotic drugs in the ICU.
- Practicing ethical and legal aspects of critical care
- Good communication skills with patient and relatives

Acute Circulatory Failure

- Classification, causes, pathogenesis and sequelae of shock
- Principles of management of all forms of shock
- Monitoring in the management of shock
- Causes of cardiorespiratory arrest and the effects on body systems
- Cardiopulmonary resuscitation and external defibrillators
- Cardiac dysrhythmias and their current therapies
- Valvular heart disease
- Endocarditis
- Pulmonary embolism
- Congestive cardiac failure
- Anaphylaxis
- Ischaemic Heart Disease and Myocardial Infarction
 - Factors involved in the balance of oxygen supply and demand to the heart
 - Aetiology of coronary artery disease and its effects
 - Signs and symptoms of ischaemic heart disease
 - Signs and symptoms of myocardial infarction
- Principles of the management of acute myocardial infarction including thrombolysis, angioplasty and surgery
- Indications for a transvenous pacemaker
- Right heart catheterisation, angiography and echocardiography
- Long-term effects of acute myocardial infarction and late complications

Respiratory Failure

- Causes and pathogenesis of respiratory failure
- Oxygen therapy and mechanical ventilatory support (invasive and noninvasive) □ Respiratory disease processes & representative conditions
- Cardiogenic/non-cardiogenic pulmonary oedema/ARDS
- Airway obstruction
- Airway stenosis and tracheomalacia
- Bronchopleural fistula
- Pneumothorax
- Aspiration syndromes
- Fat embolism
- Pneumonia (community and nosocomial)
- Chronic airway limitation
- Asthma

Renal Failure

- ▢ Definitions of acute and chronic renal failure
- ▢ Causes and pathogenesis of renal failure
- ▢ Acute renal failure
- ▢ Principles of renal replacement therapy and their indications

Neurological Failure

- ▢ Definition and causes of coma
- ▢ Causes, pathogenesis and treatment of cerebral swelling and raised intracranial pressure
- ▢ Principles of cerebral function monitoring, especially intracranial pressure
- ▢ Principles of diagnosing brain stem death
- ▢ Representative conditions to be understood:
 - ▢ Acute vascular disorders of the central nervous system
 - ▢ Acute infective disorders of the central nervous system
 - ▢ Cerebral oedema
 - ▢ Brain stem death
 - ▢ Seizures
 - ▢ Hemiplegia, paraplegia, quadriplegia
 - ▢ Guillain Barre syndrome
 - ▢ Peripheral nerve and or muscle dysfunction associated with critical illness
 - ▢ Myasthenia gravis
 - ▢ Hyperthermia, hypothermia
 - ▢ Tetanus
 - ▢ Delirium

Severe Trauma

- ▢ Effects of severe trauma on organs and organ systems
- ▢ Principles of EMST for the management of trauma and advantages of an organized team approach
- ▢ Technique of cricothyroidotomy/ tracheostomy/mini-tracheotomy
- ▢ Principles of the management of head injury and Glasgow Coma Scale
 - ▢ Management of cervical spine injuries
- ▢ Principles of the safe transfer of injured children and adults and portable monitoring systems

Sepsis

- ▢ Definition, pathogenesis and pathophysiology of sepsis and related syndromes
- ▢ Risk factors for nosocomial infection
- ▢ Infection control measures in ICU and operating suites

Supportive Care of Critically Ill Patients

- Inotropic Therapy
- Recognise when to use inotropic or vasopressor therapy
- Choose an appropriate agent, dose, physiological endpoint, rate and route of administration
- Review the efficacy of inotropic therapy at regular intervals
- Provide appropriate nutritional support and General Care
- Appropriate plan for care of bowels, skin, mouth, eyes and maintenance of mobility and muscle strength

Intensive Care: Skills

- Cardiovascular Related
- Choosing and using inotropic agents, vasodilators, and vasoconstrictors
- Managing dysrhythmias **and Dyselectrolytemia**
- Choosing and using antimicrobial agents in heart disease
- Assisting with intra-aortic balloon pumping
- Cardioversion
- Advanced life support
- Respiratory Related
- Oxygen therapy
- CPAP & Non-invasive ventilation
- Mechanical ventilation, including modes of ventilation □
- Pleural drainage
- Percutaneous tracheostomy
- Fiberoptic bronchoscopy
- Renal Failure
- General care of continuous dialysis and haemofiltration techniques
- Neurological Failure
- Maintaining cerebral perfusion pressures and intracranial pressures
- Gastro-intestinal Hemorrhage management
- Assisting with placing a Sengstaken Blakemore tube.

Diagnostic imaging and interventional procedures (radiology and cardiology): Knowledge

- Preanaesthetic preparation
- Techniques appropriate for adults and children for CT scanning, MR imaging and interventional radiology, Onco radiotherapy, Electroconvulsive shock therapy (modified ECT. angiography and interventional cardiology
- Post-investigation care

Diagnostic imaging and interventional procedures (radiology and cardiology): Skills

- Pre-anaesthetic preparation
- Sedation and general anaesthetic techniques for:
 - angiography and interventional procedures
 - CT scanning, adults and children
 - Magnetic resonance imaging
 - Problems due to magnetic field
- Post-investigation care

Pain Medicine: Knowledge

- Overview of “Pain Pathways”
- Multi dimensional aspects of pain; role of physiological, psychological and environmental factors
- Pharmacology of Analgesic Agents
- Pharmacokinetic and pharmacodynamic principles, drug interactions, and side effects.

Knowledge of the pharmacology of:

- Opioids
- Paracetamol
- Non-steroidal anti-inflammatory agents (NSAIDs)
- Antidepressants (TCAs and SSRIs)
- Anticonvulsants
- Membrane-stabilising agents
- Alpha-2 agonists
- NMDA-receptor antagonists
- Local anaesthetics
- Anti-emetics
- Agents used to treat hypotension associated with neuraxial blockade
- Awareness of the role of the following in pain management
 - Anti-migraine agents
 - Steroidal anti-inflammatory agents
 - Topical agents (NSAIDs, Capsaicin)
 - Neurolytic agents
 - Experimental agents for analgesia
- Knowledge of different routes of analgesic drug delivery, including factors governing choice of route, side effects relevant to particular route,
 - Principles of additive and synergistic effects when agents are combined
- Oral
- Intramuscular
- Subcutaneous (including continuous infusion)
- Intravenous (including continuous infusion)

- Patient-controlled analgesia (PCA) via different routes (ie intravenous, subcutaneous, intranasal, epidural, intrathecal)
- Other-methods- topical, transdermal, rectal, transmucosal (intranasal, inhalational and sublingual / buccal), intra-cerebroventricular, intraarticular, infiltration under skin

Psychological and Sociocultural Issues

The importance of psychological (emotional and cognitive), social, and other factors in the presentation and management of pain with emphasis on:

- Factors involved in the wide variation in individual response to tissue injury
- The relationship between depression and persistent pain
- The role of anxiety and/or depression in acute pain
- Differentiation of active and passive coping strategies
- The role of illness behaviour
- The influence of the health care provider on the response to pain treatment
- The importance of an interdisciplinary approach to pain assessment and treatment including the potential role of other members of the pain team (particularly psychiatrist, clinical psychologist, physiotherapist, nursing staff, occupational therapist, social worker)
- The placebo effect and its implications for treatment of pain

Pain Assessment and Measurement

Assess pain and outcome of pain treatment using history, clinical examination and pain measurement tools.

Recognise the limitations of pain measurement techniques, particularly in some patient groups (eg, persistent pain, children, those with cognitive impairment)

Understanding of – Neuroendocrine and metabolic responses to surgery stressors and impact of analgesic techniques

- Consequences of poorly controlled pain
- Current evidence for and against pre-emptive analgesia and clinical implications
- Current evidence for the effect of analgesic technique on morbidity and mortality
- Importance of aggressive multimodal postoperative rehabilitation
- Relationship between acute and persistent pain including factors involved in progression from one to the other, and potential interventions to prevent such progression

Choose the most appropriate technique of acute pain management –

- Pharmacological techniques (opioid and non-opioid) via a variety of routes
- Regional techniques including central neuraxial, plexus and peripheral nerve blockade
- Non-pharmacological techniques

Formulate a pain management plan based upon –

- Patient preference, physical and mental status, and available expertise and technology
- Special requirements in specific patient groups (eg, the elderly, children, pregnant and postpartum patients, Obstructive sleep apnoea, concurrent hepatic or renal disease; non- English speaking, cognitive impairment)

- Special requirements in patients with opioid-tolerance and/or a substance abuse disorder including an understanding of guidelines and regimens for analgesic drug use (equi-analgesic] dosing for opioids; tolerance and dependence)
- Special requirements under specific clinical situations (eg, spinal injuries, burns, acute back pain, musculoskeletal pain, acute medical pain, acute cancer pain and patients in Intensive Care and the Emergency Department)
- Include in a pain management plan
- Appropriate evaluation of the patient's pain
- Informed consent, including disclosure of risk and appropriate documentation
- Patient education about the selected technique and alternatives
- Recognise common presentations of acute musculoskeletal pain (eg, rib fracture, acute back pain) and other non-surgical acute pain syndromes (migraine, renal colic) including in the Emergency Department and Intensive Care Unit
- Identify when to seek advice from, or refer to, a Pain Medicine Specialist

Cancer Pain

Undertake assessment of pain in patients with cancer based on –

- Understanding of the multiple potential aetiologies of pain associated with cancer
- Differentiation between somatic, visceral, and neuropathic pain
- Evaluation of psychological, social, cultural and spiritual issues
- Undertake treatment of cancer-related pain syndromes based on therapies available (including chemotherapy, radiotherapy, surgery, invasive and non-invasive analgesic techniques, and psychological approaches)
- Understand guidelines and regimens for analgesic drug use including equianalgesic dosing for opioids; tolerance and dependence and their management in the patient with cancer
- Identify when to seek advice from, or refer to, a Palliative Medicine Specialist

Neuropathic Pain

- Understand diagnostic criteria, clinical features and management of specific neuropathic pain syndromes including–
- Central pain (pain after stroke, thalamic pain, spinal cord injury pain, deafferentation pain, phantom limb pain)
- Neuralgias (trigeminal neuralgia, postherpetic neuralgia, occipital neuralgia)
- Painful peripheral neuropathy (eg, metabolic, toxic, ischaemic)
- Pain after nerve injury (eg, neuroma)
- Post-surgical pain syndromes (eg, post-thoracotomy, post-CABG pain, postmastectomy, postamputation)
- Complex regional pain syndrome types I and 2 (including the differentiation of Sympathetically maintained from sympathetically independent pain)

- Recognise and understand the ways in which acute and persistent pain in children differ from pain in adults, including–
- The effect of developmental stage on assessment and management of pain in children
- The selection of pain assessment tools for children of different developmental stages
- Principles of managing acute, procedural and persistent pain in children

Pain in the Elderly:

- The epidemiology of pain syndromes in the elderly
- Physiological changes associated with ageing and effects of these on pain and pain management (including changes in pharmacokinetics, pharmacodynamics, and pain biology)
- Effects of concurrent disease, and psychological, social and cognitive changes on assessment and management of pain
- Risks associated with polypharmacy in the elderly

Demonstrate Organization of acute pain service and role of acute pain nurse for pain assessment in various groups of patients, Physiological changes secondary to Pain, practice different modalities of pain control. Pharmacology and side effects of opioid analgesia and non-opioid analgesia, principle of patient-controlled analgesia and assessment of its efficacy, Pharmacology and side effects of epidural/intra-theal opioid. Neurological assessment of epidural blockade and management of failed block. Management of regional blockade – brachial plexus, para-vertebral and intra-pleural block. Management of epidural abscess.

Substance abuse and acute pain control. Pain control in concurrent medical diseases – COAD, IHD, bleeding tendency, geriatric. Pain control in burns patients. Pain control in trauma patients included multiple rib fracture.

Demonstration of abilities to manage Chronic Pain

- Practice different modalities of chronic pain management - physical therapy, psychotherapy, (including cognitive behavioural approaches), neuroablation, neuro-augmentation, spinal opioid, interventional neuro-blockade, non-opioid analgesia.
- Anatomy, indication, technique and complication of chemical sympathectomy (lumbar sympathectomy, stellate ganglion block, celiac plexus block).
- Practice principles of management of cancer pain, principle of management of non-cancer neuropathic pain - phantom limb pain, post-herpetic neuralgia, complex regional pain syndrome, trigeminal neuralgia. Principle of management of non-cancer nociceptive pain - myofascial pain, lower back pain, intractable angina, burns, chronic pancreatitis, PVD.
- Practice Epidural steroid injection (all levels) and long-term epidural

Pain Medicine: Skills-Clinical Evaluation

- Post-graduates should demonstrate skills in the clinical evaluation of patients with acute and persistent pain by: .
- Obtaining a specific pain history – Onset, location, nature, duration, intensity, aggravating and relieving factors
- Physical, psychological and social consequences of the patient's pain
- Current and past pain treatments and outcome
- Other relevant history (past patterns of drug use or misuse, family history, medical and surgical history)
- Treatment expectations
- Interpreting relevant investigations
- Formulating a management plan and evaluating outcome

Pain Medicine-Technical Skills

Post-graduates should become competent in-

- Central neuraxial blocks
- Regional techniques (including knowledge of anatomy, technique, indications, contraindications, complications and their management) including
- Peripheral and plexus blocks of the upper and lower limb
- Head and neck blocks
- Truncal blocks including intercostal and paravertebral block

Trainees need to understand the anatomy, technique, indications, contraindications, complications and management of

- Stellate ganglion blockade
- Coeliac plexus blockade
- Lumbar sympathetic blockade
- Intrathecal drug delivery for cancer and persistent pain.

III YEAR ADVANCED TRAINING

Anaesthesia and Perioperative Care (including Analgesia) for Patients with Cardiac and Vascular Disease : Knowledge

- Pathophysiology, investigation, diagnosis, anaesthesia implications, and management of:
- Ischaemic heart disease
- Congenital heart disease
- Valvular heart disease
- Hypertension
- Cardiac arrhythmias
- Other acquired diseases, eg, myxomas, cardiomyopathies
- Understanding the principles of anaesthesia and perioperative care for patients with:

- Recent myocardial infarction
- Ischaemic heart disease
- Cardiac valvular lesions
- Congenital heart disease, corrected and uncorrected
- Hypertensive disease
- Cardiac arrhythmias
- Other acquired diseases, eg, myxomas, cardiomyopathies
- Cerebrovascular disease
- Peripheral vascular disease

Anaesthesia for Cardiac Surgery-- Understanding the anaesthesia, complications and perioperative care (including analgesia) of:

- Coronary revascularisation with/without cardiopulmonary bypass
- Valvular repair or replacement
- Emergency cardiac surgery
- Cardioversion
- Procedures in the cardiac catheterisation laboratory
- Electrophysiological procedures
- Congenital heart disease surgery (paediatric and adult)
- Procedures on the great vessels, eg, for aortic dissection
- Heart or heart/lung transplantation

Anaesthesia for Vascular Surgery --Understanding the anaesthesia, complications and perioperative care (including analgesia) of:

- Surgery on the vessels supplying the head and neck
 - Surgery on the abdominal vessels
 - Surgery on the limb vessels
 - Minimally invasive procedures on the vessels (eg, intraluminal stenting)
- Understanding the principles, role, and management of procedures, problems, or events associated with anaesthesia for cardiac and vascular surgery, including:
- Myocardial protection strategies
 - Cerebral protection
 - Spinal cord protection
 - Blood coagulation and anticoagulation and its monitoring
 - Perioperative arrhythmias
 - Poor cardiac output states
 - Temperature management (including deep hypothermic circulatory arrest)
 - Cardiopulmonary bypass including weaning from bypass and ECMO
 - Cross-clamping of the aorta

Organ Transplantation -- Anaesthesia for organ transplantation including:

- Legal and ethical considerations of organ harvesting and transplantation
- Brain death and the legal definition of death
- Physiological and pharmacological considerations

Protocols and planning Anaesthesia for Patients with Pulmonary Disease Chronic respiratory disease, pathophysiology, diagnosis

- Preoperative evaluation of patients with respiratory diseases
- Lung function tests
- Thoracic trauma Anaesthesia and Perioperative Care (including Analgesia) for Thoracic Surgery
- Preoperative assessment for fitness for lung surgery and one-lung ventilation
- Thoracotomy and – Lung resection, including pneumonectomy and lung reduction surgery
- Mediastinal mass resection
- Oesophageal surgery
- Surgery on the thoracic aorta
- One-lung anaesthesia, including management of hypoxia and ventilation
- Differential lung ventilation
- Tracheal and bronchial surgery (including use of lasers and stents)
- Thoracoscopic procedures
- Bronchoscopy, including removal of foreign body
- Mediastinoscopy
- Lung or heart/lung transplantation
- Management of problems or critical events : –
- Fluid management postpneumonectomy
- Cardiac herniation postpneumonectomy
- Bronchopleural fistula
- Lung bullae and cysts
- Tension pneumothorax
- Superior vena cava obstruction
- Empyema
- Understanding the types and uses of endotracheal, double-lumen, and endobronchial tubes and bronchial blockers
- Understanding chest tube drainage systems and suction

ANAESTHESIA AND PERIOPERATIVE CARE (INCLUDING ANALGESIA) FOR PATIENTS WITH CARDIAC AND VASCULAR DISEASE “ SKILLS – CLINICAL

Post-graduates should be Competent in the following

- ▢ Fibreoptic bronchoscopy
- ▢ Placement and use of vascular monitoring lines (arterial, central venous, pulmonary artery, and femoral and neck vessels)
- ▢ Basic trans-oesophageal echo examinations (subject to local practices)
- ▢ Use of cardiac pacemakers
- ▢ Placement of endobronchial tubes and blockers
- ▢ Use of bougies and tube exchangers

Post graduates should be able to perform

- ▢ Interpretation of ECGs and ECG monitoring
- ▢ Interpretation of chest x-rays and common chest CT and MRI imaging films
- ▢ Assistance with cardiopulmonary bypass
- ▢ Placement and care of chest drains and appropriate use of suction

NEUROANAESTHESIA: KNOWLEDGE

- ▢ Neuro anatomy -- Central nervous system, Spinal cord and meninges
- ▢ Ventricular system and flow of CSF
- ▢ Blood supply to brain and spinal cord
- ▢ Cranial vault and spinal column
- ▢ Cerebral blood flow and Cerebral blood volume
- ▢ Cerebral metabolism
- ▢ Cerebrospinal fluid dynamics and physiology
- ▢ Intracranial pressure
- ▢ Blood-brain barrier
- ▢ Physiology and metabolism of normal and abnormal brain and spinal cord
- ▢ Physiological and metabolic effects of anaesthesia on brain and spinal cord
- ▢ Abnormal water and sodium homeostasis
- ▢ Temperature and CNS function
- ▢ Pharmacology relevant to neuroanaesthesia:
 - ▢ Sedatives
 - ▢ Hypnotics
 - ▢ Analgesics
 - ▢ Inhalation agents
 - ▢ Neuromuscular blocking drugs
 - ▢ Anticholinesterases
 - ▢ Neuroprotection
 - ▢ Diuretics
 - ▢ Hypotensive agents
 - ▢ Vasopressors

- Corticosteroids
- Drug interactions with neuromuscular disorders
- Principles of clinical measurement and monitoring in neuroanaesthesia, including techniques and clinical importance.
- Haemodynamic and respiratory monitoring
- Cerebral blood flow
- Intracranial pressure (ICP) and cerebral perfusion pressure
- Cerebral metabolism
- Transcranial doppler ultrasonometry
- Electrophysiological monitoring, eg, electroencephalogram and evoked potentials
- Electrical safety standards

Interventions to minimise Cerebral Damage

- Principles of cerebral protection
- Haemodynamic stability
- Fluid and osmotic therapy
- Management of intracranial hypertension
- Sedation and ventilatory support

Anaesthesia for Neurosurgery

- Understanding the assessment, anaesthesia and perioperative care of patients for:
- Intra cerebral vascular surgery
- Extra cerebral vascular surgery
- Supratentorial surgery
- Posterior fossa surgery
- Pituitary surgery
- Epilepsy surgery
- 'Awake craniotomy'
- Craniofacial and craniobasal surgery
- Spinal surgery
- Emergency spinal cord decompression
- Paediatric neurosurgery

Principles, role and management of procedures, problems, or events associated with anaesthesia for neurosurgery: –

- Positioning for neurosurgery
- Use of inhalation or total intravenous general anaesthesia
- Induced hypotension
- Induced hypertension
- Hypothermia
- Sitting position

- Air embolism; precautions, diagnosis and management
- Injury of head, spinal column and neurological injuries
- Epilepsy and other neurological disorders
- Paediatric considerations

Neuroanaesthesia: Skills

- Pre-anaesthesia preparation for neuroanaesthesia
- Monitoring in neuroanaesthesia – setting up and calibration, placement of cannulae, interpretation of variables
- Post-anaesthesia care and post neurosurgical care
- Protocols and drills for
- Failed airway intubation
- Reducing raised ICP
- Suspected cervical spine injury
- Intraoperative air embolism
- Initial management of a head injury
- Positioning of patients.

Special procedures which the post graduate student must be able to perform at the end of 3 years

1. Failed intubation drill (includes Fiberoptic Laryngo/Bronchoscope)
- 2 . Double Lumen Tube
3. Bronchial Blocker placement
- 4 Jet Ventilation
5. Suctioning and physiotherapy of wet lung
6. Intubation in Neonates
7. Initiation and management of ventilation
8. Combined Spinal Epidural
9. Brachial Plexus Block
10. Intravenous Regional Anaesthesia
11. Elbow, Wrist, Digital, Sciatic, Femoral, Lateral Cutaneous Nerve of thigh, Ankle - each
- 12 Cervical-Superficial and Deep, Stellate, Splanchnic - each
13. Central Venous Line by Brachial, Jugular and Subclavian veins
14. Radial and Femoral Artery cannulation
15. CVP monitoring
16. Pulmonary Capillary Wedge Pressure [observed]
17. Neuro-muscular transmission Monitoring
18. Anaesthetic Depth eg. BIS monitoring [observed]

ATTITUDES INCLUDING COMMUNICATION AND BEHAVIOUR FOR THE POST-GRADUATES:

To learn the attributes of a

- Medical expert
- Communicator
- Collaborator
- Manager
- Teacher
- Professional
- To practise good communication with colleagues, patients and others
- To work as a member of a team, but to assume responsibilities and/or delegate duties as a team leader when necessary
- To commit to, and believe in, a culture of safety and ethical, high quality care
- To accept that medical knowledge and skills are not the only requirements of specialist practice
- To be aware of medicolegal obligations relating to medical practice
- To have insight into one's own limitations, abilities and areas of expertise
- To commit to continuing professional development.

TRAINING IN RESEARCH METHODOLOGY, MEDICAL ETHICS, BIO ETHICS AND MEDICOLEGAL ASPECTS

Students should compulsorily attend the research Methodology workshop conducted by the University **within first six months of the M.D course.**

Students are encouraged to attend workshops/CME's on Bioethics **conducted by the University and other reputed Institutions.**

Medical ethics, bioethics, moral and legal issues, medical audit are part and parcel of the curriculum and syllabus

Professionalism and Ethics

To commit to, and believe in the ethical and professional principles –

- The best care for the patient must be the principal driving force of practice
- *Patient autonomy*: patients' ability to determine their treatment
- *Beneficence*: the principle of "doing good" to patients
- *Non-maleficence*: the principle of not doing harm to patients

- *Fidelity*: faithfulness to one's duties and obligations. This principle underlies excellence in patient care, confidentiality, telling the truth, a commitment to continuing professional development and lifelong learning, and not neglecting patient care
- *Social justice*: the right of all patients to be fairly treated
- Duty to oneself in terms of personal health care, and maintenance of competence to practise
- *Accountability*: the anaesthetist is responsible for his/her actions
- Honour and integrity in all conduct, including the generation and use of resources □ Respect for others, work as a team and practise conflict resolution
- Appropriate response to clinical error

Patient Considerations

To commit to, and believe in, the rights of patients with respect to:

- Autonomy
- Confidentiality of the doctor-patient relationship
- Appropriate, excellent clinical care, including pre-operative assessment □ Informed consent
- Comprehension of the risks of anaesthesia techniques
- Appropriate care irrespective of race, culture, gender and socio-economic status □ Research Considerations
- To value rigorous educational and scientific processes □ To commit to the ethical principles of research

4. STRUCTURED TRAINING PROGRAMME

Duration of the training 3years

Orientation-

- To the hospital, wards, operation theatres and peripheral areas □ Anesthesiology as a subject
- Assigning Thesis guides

Objectives for 1st year

- Orientation- To the hospital, wards, operation theatres and peripheral areas and also to Anaesthesiology as a subject
- To observe and learn assessment and management of cases in ASA I and II in the specialities of General Surgery, Orthopaedics, Gynaecology and Recovery room. The level of supervision is slowly graded to facilitate independent management of general and spinal anaesthesia.
- Should learn the basic principles of safe and effective anaesthesia, resuscitation, and both the prevention and treatment of pain, perioperative care of the surgical patient, care of handling equipments, basic techniques in anaesthesia, and anaesthetic pharmacology, and electrical safety.
- They should attend the practical guidance workshop on research methodology and should have a knowledge about basic concepts of research, biostatistics etc.
- He/she should select the thesis topic and submit the protocol for his thesis.
- **Should have attend and got trained in BLS, ACLS, PALS and ATLS**

Objectives for 2nd year

The student should be trained in administration of general anaesthesia and regional anaesthesia for ASA I to V under supervision

- General and regional anaesthesia (including epidural, nerve and plexus blocks) for ASA III AND IV cases in the specialities of Paediatrics, ENT, Dental, ICU, Obstetrics, Eye, Urology, Pain, Peripheral areas and Trauma.
- The post-graduate should be able to analyse a journal article and data and able to present free papers in conferences and should attend continuous education programme & workshops.
- The post graduate should start working on the thesis/Dissertation and should complete the at the end of second year.

Objectives for 3rd year

- Thesis should be submitted minimum of 6 months before the final MD examination
- Post-graduates should be able to anaesthetise under supervision cardiac, neuro, paediatric and all major cases.
- They should be able to anaesthetise all other elective and emergency cases independently and manage acute pain and make decisions and know how to organize mass casualty.
- **Simulation based training:**
Simulators should be used for the events of high importance but infrequent occurrence and where there may be high risks to the patients. The simulators can also be used for assessment purposes.

5. Teaching methodology

- Teaching should include seminars, journal clubs, symposia, tutorials, case discussions, and research presentations.
- Reviews and guest lectures should get priority for theoretical knowledge.
- Bedside teaching, grand rounds, interactive group discussions and clinical demonstrations should be the hallmark of clinical/practical learning.

Didactic lectures are of least importance.

- Student should have hands-on training in performing various procedures (medical/surgical concerning his specialty) and ability to interpret various tests/investigations.
- Exposure to newer specialized diagnostic/therapeutic procedures concerning his/her subject should be given.
- A postgraduate student of a postgraduate degree course in broad specialties/super specialties would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.

- Log books shall be maintained regularly and should be checked and assessed periodically by the faculty members imparting the training.
- The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
- Department should encourage e-learning activities.

6. POSTINGS FOR ANAESTHESIOLOGY POST GRADUATE

The post graduate student should be exposed to the following areas of clinical anaesthesia practice:

1. Pre-anaesthesia clinic
2. Pain clinic
3. Recovery and Post anaesthesia Care Unit (PACU)
4. Intensive Care Units
5. Dialysis and transplant
6. All specialty theatres
7. Peripheral areas: Radiology, MRI, ECT and other interventional laboratories

First year : Basic skills and orientation to broad specialty departments

- | | |
|-----------------------------|----------|
| 1. General surgery : | 4 months |
| 2. Orthopedics surgery | 1 month |
| 3. Pre assessment clinic | 1 month |
| 4. ENT | 1month |
| 5. Medicine /Toxicology ICU | 1 month |
| 6. PACU/Recovery room | 1month |
| 7. Causality / Trauma | 1month |
| 8. Obstetric & Gynecology: | 1 month |
| 9. Pain Management | 1 month |

2nd year multi specialty training

1. Paediatric surgery OT	1 month
2. Ophthalmic surgery	1 Month
3. Urology OT	1month
4. Surgical gastroenterology	1month
5. Neuro surgery	1 month
6. Cardio thoracic surgery	1 month
7. RADIOLOGY SUITES [radiology & radiotherapy]	1 month
8. ICU/IRCU/PACU	1 month
9. OBG	1 month
10. Special postings for learning new advanced techniques / procedure / skills in specialized institutions or when the Institution does not have a fully functioning specialized dept	2 months

During IInd year, the Students are encouraged to undergo special postings for learning new advanced techniques / procedure / skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

3rd year multi-specialty training

ENT & Faciomaxillary Surgery	1 month
Paediatric surgery	1 month
Neuro surgery	1 month
Plastic surgery	1 month
Cardio thoracic surgery	1 month
Transplant surgery OT	2 months
Vascular / Endocrine/ Geriatrics	1 month
Urology	1 month
Neonatology/ Cardiology Intensive Care	1 Month
Organ transplant OT & ICU	2 months

Emergency Operation Theatre & Day care surgery postings on rotation

7. Evaluation of the candidate

Evaluation of the candidates in both theory and practical aspects will help the candidate in improvement of his/her knowledge, skills and attitude.

8. METHODS OF FORMATIVE ASSESSMENT TO BE DONE

1. DIRECT OBSERVATIONAL PROCEDURAL SKILLS [DOPS]

The trainee performs a procedure and the assessor scores based on set criteria.

2. PROBLEM BASED LEARNING [PBL]

The trainee is given a problem faced during a their posting and the teacher sets the objective and then the students discuss based on the objectives .

3. Case or chart-based discussion

The trainee brings a number of anaesthetic records of cases that they have been involved in and the assessor picks one for discussion. The emphasis is upon the decision-making involved in the management of the case, rather than the depth of knowledge

4. CLINICAL EVALUATION EXERCISE [CEX]

The CEX tool looks at the trainee's performance in a case rather than focusing on a specific procedure, e.g. the anaesthetic management of a patient with renal failure.

5. TESTS

6. ACTIVITIES PARTICIPATION [SKILL TRAINING , CME , SEMINARS etc]

7. CRITICALLY REVIEW OF JOURNALS

8. PROGRESS IN THESIS.

9. LOG BOOK MAINTENANCE

COMPETENCY ASSESSMENT – twice a year in June & December
20 MARKS ADDED IN VIVA

Postgraduate Students Appraisal Form - Clinical Disciplines

Name of the Department:

ANAESTHESIOLOGY

PG Name of the PG Student :

Period of Training : FROM.....TO.....

	PARTICULARS	METHOD OF ASSESSMENT	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks: For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.
	Marks		1 2 3	4 5 6	7 8 9	
	Journal based / recent advances learning					
	Patient based /Laboratory or Skill based learning	Direct Observation Procedural Skill [DOPS]				
	Self directed learning and teaching	Problem Based Learning [PBL]				
	Departmental and interdepartmental learning activity	CBD [Case Based Discussion] CEX [Clinical Evaluation Exercise]				
	Written Test	1 test every 2 months				
	External and Outreach Activities / CMEs					
	Thesis / Research Work					
	Log Book Maintenance					

Publications Yes/ No.

SIGNATURE OF ASSESSEE

SIGNATURE OF

CONSULTANT SIGNATURE OF HOD

OVERALL marks for evaluation of the student :

1. Communication / commitment / Compassion towards patients	- 5 Marks
2. Formative Assessment [average of the total score]	- 5 marks
3. Number of Posters/Papers presented in Conferences/ Publications and Research Projects	- 5 marks
4. No. of Medals / Certificates won in the conference / Quiz competitions and other academic meetings with details.	- 5 marks
Total	----- 20 Marks -----

ASSESSMENT SCHEDULE IS AS FOLLOWS

Year of study	Period				Total Max.20 marks	Marks
I year	Up to Dec	10 marks	Up to June	10 marks	20 Marks	
II year	Up to Dec	10 marks	Up to June	10 marks	20 Marks	
III year	Up to Oct	10 marks	Up to Feb	10 marks	20 Marks	
	AVERAGE				20 Marks	

9. Dissertation and University Journal of Medical Sciences:

As per the 49th SAB Resolution under Point No. 2 and in the 52nd SAB it was reiterated regarding the topic for dissertation

The topic for the dissertation should be registered and sent to the University after Ethics Committee approval before 31st of December of the first Post Graduate Year. Only one change of topic with proper justification from the Head of the Department is permitted before 31st March of the first Post Graduate Year. The change of dissertation title will not be permitted after 31st March of the First Post Graduate Year. This modification in regulation will be scrupulously followed from the academic year 2015-16 admission onwards.

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause 13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.

As per MCI Clause 14 (4)(a), thesis shall be submitted atleast 6 Months before the Theory and Clinical/Practical Examination.

A candidate shall be allowed to appear for the Theory and Practical/Clinical Examination only after the acceptance of the Thesis by the Examiners.

The periodical evaluation of dissertation/log book should be done by the guide / HOD once in every six months. The HOD should ensure about the submission of dissertation within the stipulated time.

Regarding submission of articles to the University Journal of Medical Sciences for all the PG Degree/Diploma courses, it is mandatory that the students have to submit at-least one research paper. Case Reports are not considered as Research Paper

10. Examination

THEORY EXAMINATIONS:

Theory examination will comprise 4 papers.

Paper I: Basic Sciences as applied to Anaesthesiology

Paper II: Practice of Anaesthesia: Anaesthesia in relation to associated systemic and medical diseases.

Paper III: Anaesthesia in relation to subspecialties/superspecialties

Paper IV: Intensive Care Medicine, Pain Medicine and Recent advances.

All the four question Papers will have following pattern

I. Elaborate on 2 x 15 = 30

II. Write note on 10 x 7 = 70

100 Marks

PG CLINICAL PRACTICAL EXAMINATIONS:- 300 MARKS

Clinical case		150 marks (70+40+40)
VIVA including Competency Assessment	-	80 Marks (60 + 20)
Ward rounds		25
OSCE		25
Log Book		20 marks

PRACTICAL EXAMINATIONS:-

Morning session

Long case-1×70 Marks	Clinical case	70 marks
	40 minutes case examination and 20 minutes for discussion	
Short cases-2×40 Marks	10 minutes for each case examination and 20 minutes for each case discussion	80 marks

Total marks for morning session 150 marks (A)

Afternoon session

Ward rounds / Case Scenario - 5 × 5 marks 5 mins each case discussion	25 marks (B)
OSCE 5 stations × 5 marks	25 marks (C)
VIVA - 15 mins for each station 4 stations	80 marks (D)
1. Anaesthesia machine including circuits and Vaporizers, ETT, Supraglottic Airway devices, ICU Ventilator and oxygen therapy equipment.	15

2. Resuscitation equipments, resuscitation demonstration, Difficult Airway, Equipment, monitoring equipments.	15
3. Anaesthetic Drugs, Emergency Drugs, IV Fluids, Nerve Blocks (skeleton) .	15
4. Investigation :ECG, X-rays, ABG Cards, Pulmonary function tests, Capnographs, clinical exercises card	15
5. COMPETENCY ASSESSMENT	20
Log book	20 marks (E)
Aggregate Total (Clinical + Viva)	300
Minimum required marks for pass (50%)	(A+B+C+D+E)
	150
Thesis	Approved/Not approved

11. Log book

- A detailed log book should be maintained for the entire duration of the course. It should contain the following details.
- Procedures performed [total cases / procedures done, Detailed pre ,intra and post operative notes for 10 cases / procedures per posting done based on the cognitive ,psychomotor and affective domains of learning]
- Journal clubs/Clinical Meetings □ Seminars/CME/Conferences
- Important cases discussed/presented
- The Post Graduates students shall maintain a record (Log) book of the work carried out by them and the training Programme undergone during the period of training.
- Periodic review of Log book have to be done in the Department by guide/HOD once in every 6 months
- Since Anaesthesia postgraduates are posted to different specialties and intensive care areas the depts should create separate log books for each specialty giving special importance to important learning objectives during that posting instead of having the same log book for all posting. This will meet the “SUBJECT SPECIFIC LEARNING OBJECTIVES”of NMC.

VIVA including Competency Assessment :

VIVA including Competency Assessment - 80 Marks (60 + 20)

- Anaesthesia Machine, Gas cylinders, Equipments, Monitors
- Drugs, IV fluids, Instruments, Procedure Tray
- Investigation Charts, ECG, Xray, ABG, Capnograph, Ventilator Graphics, etc..
- Resuscitation mannequin, Difficult airway mannequin, Defibrillator , Ventilator

14. OSCE

Five stations – Five minutes each station

5X5 =25 marks ©

1. Equipments, monitors, circuits, Vaporiser
2. Flow volume loops/ABG/ Capnographs/ Ventilator graphs /
3. Physiology, History relevant to Anaesthesiology
4. Drug Pharmacology, invasive procedure, Nerve block
5. Communication skill assessment- high risk informed consent, Cancellation/ consent for tracheostomy due to difficult intubation, Delayed recovery, Breaking bad news,etc.

15. REFERENCE BOOKS

S.No.	Name of the book	Author
1.	A synopsis of Anaesthesia	J. Alfred Lee
2.	Management of pain	J.J Bonica
3.	Anaesthesia for infants and children	R.M Smith
4.	A Practice of Anaesthesia	Wylic and Churchill Davidson
5	Anaesthesia - Vol.I and II	Miller
6	Clinical Anaesthesia	Barash
7.	Critical Care	Joseph Civetta
8	Anaesthesia and neurosurgery	Cottrell and Smith

9	Cardiac anaesthesia	Kaplan
10	Paediatric anaesthesia	Gregory
11	Pharmacology & Physiology in Anaesthetic practice	Robert K. Stoleting
12	Anaesthesia for Co-existing diseases	Robert K. Stoleting
13	Understanding Anaesthesia Equipment	Dorsch and Dorsch

**** Note :** The editions are as applicable and the latest editions shall be the part of the syllabi.

16. JOURNALS

1. Anaesthesiology
2. Anesthesia Analgesia
3. Anaesthesia
4. Anesthesia Intensive Care
5. Canadian Journal of Anaesthesia
6. British Journal of Anaesthesia
7. Indian Journal of Anaesthesia
8. Indian Journal of Anaesthesiology Clinical Pharmacology
